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Demersal Fish Northern

Two German plaice tagging experiments (1970) in the North Sea.

by

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1. Introduction

Several German plaice tagging experiments have been carried out in the last years in order to collect more information on the migration pattern of plaice in coastal and offshore waters of the North Sea.

In 1965-66 a juvenile flat fish tagging experiment of plaice, dab and sole had been conducted in the German Waddensea area and the mouth of the river Elbe (RAUCK, 1967).

Since then several experiments in offshore waters have been carried out of which one has been published so far (RAUCK, 1976). The results of two further experiments which have been conducted in Febr./March 1970 are presented in this article.

2. Material

The two experiments have been carried out on board the German research vessel "Friedrich Heincke" at about the same time but at different localities.

The tagging experiment called "A" has been conducted on the 11.03.-16.03.1970 in the area of the Southern and Northern Schlickbank being the traditional plaice fishing grounds for most of the fishermen from Hamburg especially during this time of the year (Fig. 1).

The experiment called "B" was carried out on the 28.02.-02.03.1970 off the Dutch coast in the Terschelling Bank area (Fig. 1). In

both cases the plaice were caught by one hour trawl hauls, kept on deck in tanks, tagged and released immediately at the hauling position.

After having conducted the comparison tagging (3) between the Petersen disc and the method developed by RAUCK (4) which yielded in about the same recoveries, the latter one using soft red plastic discs of 3 cm \emptyset were chosen.

In area A 670 plaice, in area B 338 plaice were tagged. The length distribution of the tagged plaice is given in Fig. 2, the average length in area A was 34.4 cm, in area B 26.7 cm.

3. Results

3.1. Return rate

The two experiments yielded in different return rates. In experiment A 233 (35.7%) of 674 tagged plaice were recaptured, in experiment B 91 (26.8%) out of 338 tagged plaice were reported. Both figures are rather low, compared to the results of the December 1969 tagging which yielded 47.1 % . The different results are definitely linked with the haul duration. In December 1969 the trawling duration was 30 min. only, in the Febr./March experiment 60 min. The differences in the return rate of experiment A and B is also related to the position of the tagging area and the different fishing effort.

The plaice tagged in area B were 2 months later up to the end of the year 1970 under heavy exploitation by the dutch beamtrawlers (Table 2). This can also be seen from the high return figures in the year 1970 (Table 1) and the early end of the reporting period in 1972 (Table 2).

The plaice in the tagging area A however are during the first year and also later mainly out of the range of the dutch beamtrawlers.

The length increase per quarter as well as the number of plaice reported by quarters for both tagging experiments are given in Table 3.

Both tagging experiments show always in the first quarter from 1971 onwards the highest return figures. In case of experiment A these high figures are due to the aggregation of ripe males and females in this area at this time.

The catch per day figures for the German cutters from 1971 onwards are corresponding with the total number of returns from all countries (Fig. 3).

The recovery rate is highly depending on the length of plaice when tagged. Up to a size of about 33 cm for both experiments there is a clear and positive correlation between return rate and fish size (Fig. 4).

However, the larger fish of experiment A show a decreasing return rate. This is in good agreement with the results of a tagging experiment carried out by de VEEN (1).

3.2. Migration

Experiment A

The migration pattern of the tagged plaice in area A is given in Fig. 5a, b, c, d by quarters. Each sign is representing one returned plaice. The different signs indicate the different countries. The position of the signs in each rectangle indicates the year.

1970	= upper left corner
1971	= upper right corner
1972	= lower right corner
1973 +>	= lower left corner

Fig. 5 a shows the distribution pattern of the first quarters of the year 1970-1973 +> . One month after the tagging most plaice were caught near the release position. Even during the same quarters of the following years plaice had not moved too far except some to the SW and NW. Surprisingly the picture for

the second quarter (April-June) and the third (July/Sept.) does not show any further migration. Only the last quarter (Fig. 5d) shows few plaice which have moved towards the Southern Bight.

Experiment B (Fig. 6a, b, c)

The migration of Experiment B is completely different from this of A. Most of these fish show a migration along the coast from the Southern Bight into the German Bight and do not mix with those plaice of experiment A.

4. Conclusion

Obviously the plaice of the two tagging experiments differ in many respects. Those plaice of experiment B are of smaller size and less old. Their migration pattern fits exactly into this of the December tagging experiment (RAUCK, 3). During the first quarter most plaice are reported from the Southern Bight (Fig. 7). During the second quarter half of the plaice are still in the southern Bight, the other half has left the spawning area and has already moved to the feeding grounds in the inner German Bight. During the third quarter the plaice have distributed off the German-Danish coast. During the 4. quarter the plaice are already on their way to the Southern Bight (1-3 quarter Fig. 7).

Those plaice tagged and released in area A are older and larger in size and seem to feed and spawn at the same place. They do not show any movement out of the indicated area (Fig. 7) (with few exceptions) and do not overlap very much with those plaice from tagging experiment B.

5. Literature

- (1) de VEEN, J.: The 1960 tagging experiments on mature plaice in different spawning areas in the Southern North Sea.
ICES C.M. Near Northern Seas Comm. (44), 1961

- (2) Rauck, G.: Tagging of juvenile flat fish at the German North Sea coast.
ICES, C.M., F:25, Demersal Fish (Northern) Comm. 1967
- (3) Rauck, G.: Plaice tagging experiment (December 1969) in the inner German Bight.
ICES, C.M., F:32, Demersal Fish(Northern) Comm. 1976
- (4) Rauck, G.: A simple way for tagging flatfish by means of a "tagging gun".
ICES, C.M., F:16, Demersal Fish (Northern) Comm. 1969

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Table 1: No. of returns from tagging experiment A and B per year

Year/%	1970 %	1971 %	1972 %	1973 %	1974 %	1975 %
<u>A</u> No. of returns	127 54.7	59 22.0	36 15.5	12 5.2	4 1.7	2 0.8
<u>B</u> No. of returns	72 83.7	9 10.5	5 5.8	- -	- -	- -

Table 2: No. of returns from tagging experiment A and B by countries

	Experiment A		Experiment B	
	n	%	n	%
Netherlands	35	14.6	63	69.2
Denmark	118	49.4	18	19.8
U.K.	60	25.1	8	8.8
Germany, F.R.	26	10.9	2	2.2
Total	239	100.0	91	100.0

Table 3: Length increase of plaice/quarter of tagging experiments A and B

A

cm	1970				1971				1972				1973				1974				1975	
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II
0	9	35	10	1	5	-	-	1	3	-	1	1	2	-	-	-	-	-	-	-	-	-
1	1	13	8	1	5	1	3	-	1	-	-	1	-	1	1	-	1	-	-	-	1	-
2	-	4	14	2	6	3	1	-	-	1	-	-	-	-	-	1	1	-	-	-	-	-
3	-	1	10	3	4	2	1	1	2	1	2	-	-	-	-	-	-	-	-	-	-	-
4	-	1	4	1	1	2	-	-	2	2	2	-	1	-	-	-	-	-	-	-	-	-
5	-	-	3	-	-	6	-	2	1	1	1	-	1	1	-	-	-	-	-	-	-	1
6	-	1	1	2	-	1	1	1	1	1	1	-	1	-	-	-	-	-	-	-	-	-
7	-	-	-	-	1	-	-	-	1	1	-	-	-	-	1	-	-	-	-	-	-	-
8	-	1	-	1	1	-	-	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	56	50	11	23	15	6	7	13	10	8	5	4	4	3	1	4	-	-	-	1	1

B

cm	1970				1971				1972			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
0	8	32	4	-	2	-	-	-	-	-	-	-
1	-	8	5	1	1	-	-	-	1	-	-	-
2	-	6	3	1	-	1	1	-	-	-	-	-
3	-	1	1	-	1	-	-	-	-	1	-	-
4	-	-	1	-	-	-	-	-	1	-	-	-
5	-	-	-	-	-	-	-	-	1	-	-	-
6	-	-	1	-	-	-	-	-	1	-	-	-
7	-	-	-	-	-	1	-	1	-	-	-	-
8	-	-	-	-	-	1	-	-	-	-	-	-
	8	47	15	2	4	3	1	1	4	1	-	-

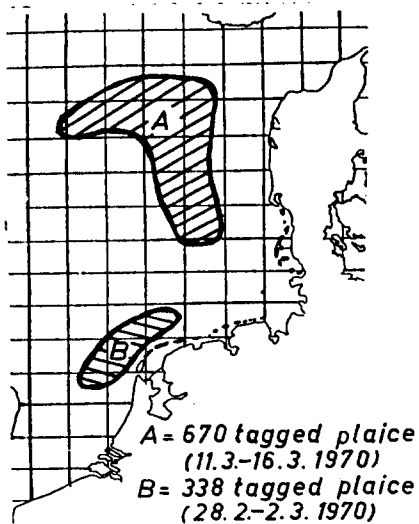


Fig. 1: Tagging areas A and B.

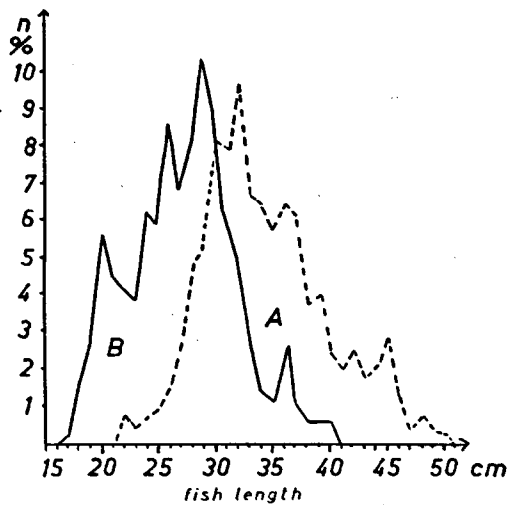


Fig. 2: Length distribution of tagged plaice.

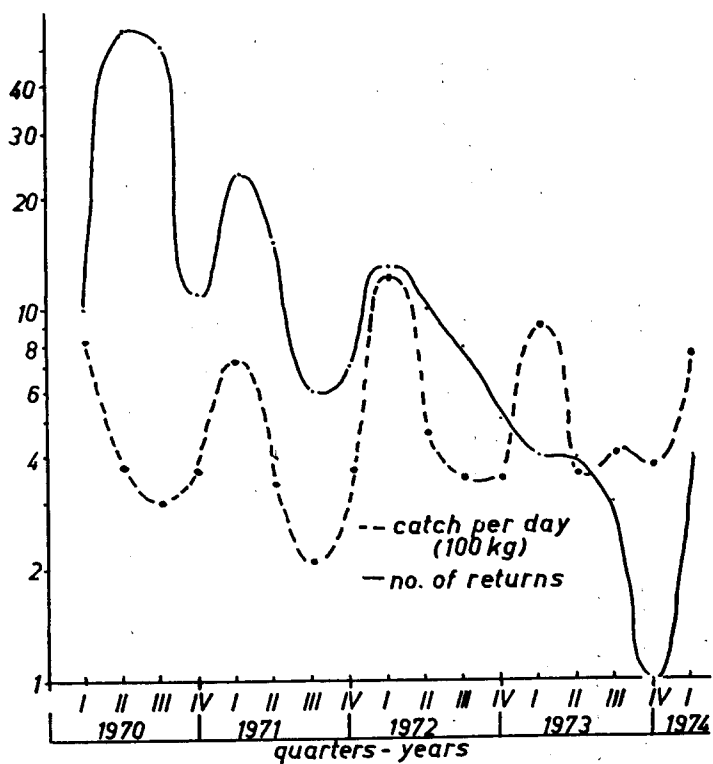


Fig. 3: Catch/day (German vessels) and No. of returns in area A.

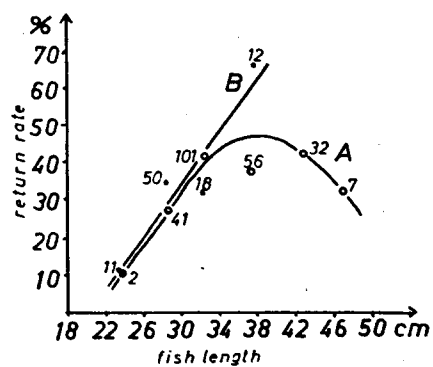


Fig. 4: Return rate/fish length.

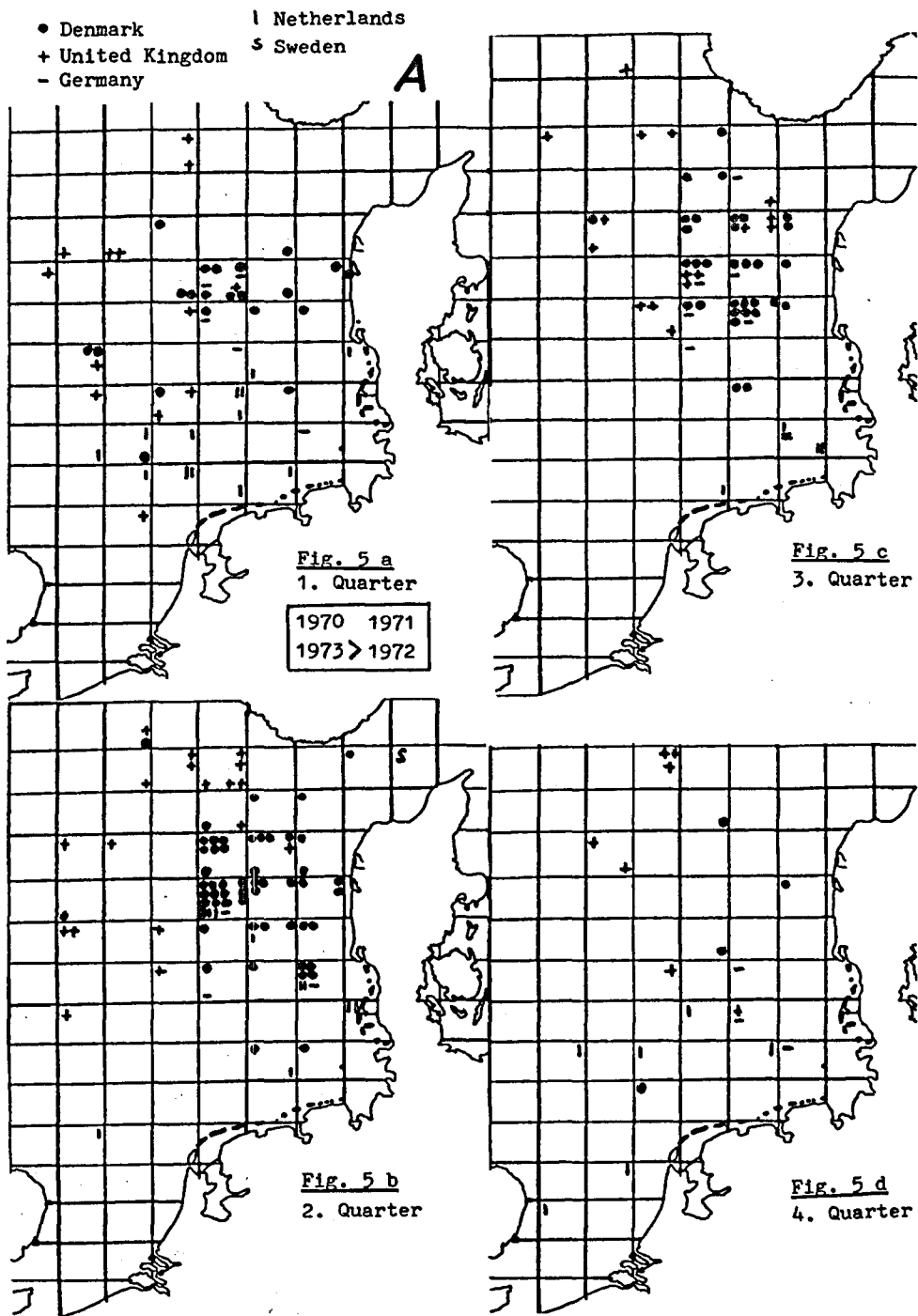


Fig. 5: Migration pattern of the tagged plaice of experiment A.

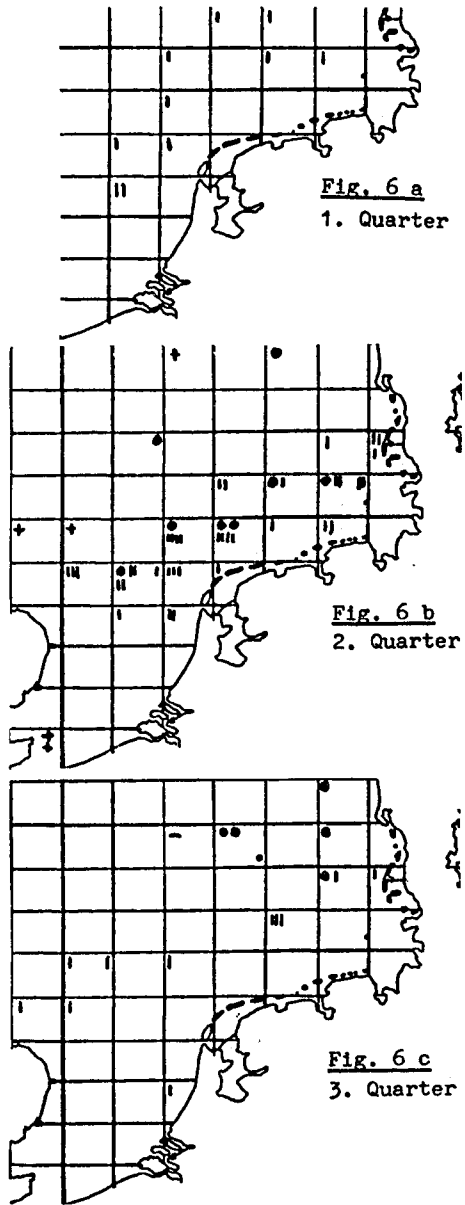


Fig. 6: Migration pattern of the tagged plaice of experiment B.

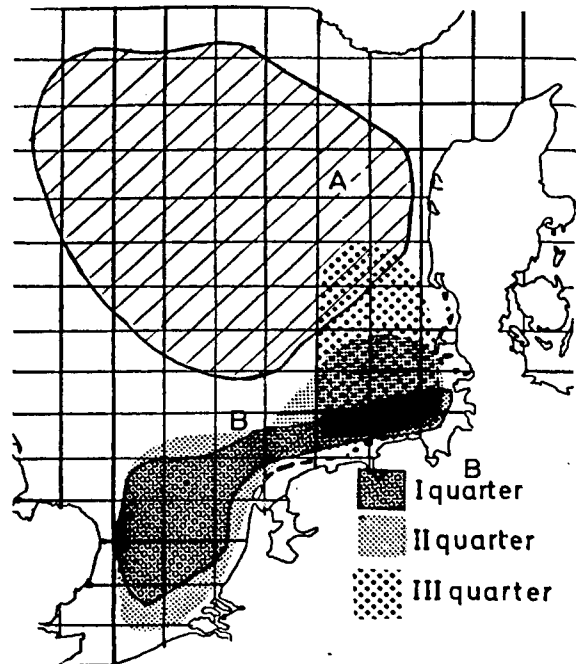


Fig. 7: Plaice migration